

CLASSIFICATION OF THE HAPLOMITRIALES AND METZGERIALES  
INTO THE SUBCLASS METZGERIIDAE, SUBCLASS NOV.  
(HEPATOPHYTA, JUNGERMANNIOPSIDA)

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ABSTRACT

Information gained from a detailed comparative morphometric investigation of the liverwort *Haplomitrium* Nees, has led to a re-evaluation of its phylogenetic alliances and the creation of a new subclass, the Metzgeriidae, to contain the orders Haplomitriales and Metzgeriales. This subclass, as circumscribed by Bartholomew-Began (1990), is herein validated.

KEY WORDS: *Haplomitrium*, Metzgeriidae, Hepatophyta

DISCUSSION

The placement of *Haplomitrium* Nees above the ordinal rank has varied with the changing phylogenetic concepts regarding the origin of bryophyte groups. However, the classification of *Haplomitrium* has consistently reflected the belief that it is an ancient, isolated taxon with only remote affinities to other groups. Stotler & Crandall-Stotler (1977), who viewed the bryophytes as a polyphyletic group, placed *Haplomitrium*, with *Takakia* Hatt. & Inoue, in the class Haplomitriopsida of the division Hepatophyta, coordinate with the Jungermanniopsida (comprising the Metzgeriales and Jungermanniales), and the Marchantiopsida. In contrast, Schuster (1984), considered the hepatics as a class of the division Bryophyta. He rejected the organization presented by Stotler & Crandall-Stotler (1977) in favor of a system in which the hepatic

orders Haplomitriales (= Calobryales), Metzgeriales, and Jungermanniales are all grouped within the subclass Jungermanniidae, class Hepaticopsida (= Hepaticae).

Information gained from a recent comparative morphogenetic re-evaluation of *Haplomitrium* (Bartholomew-Began 1990) has demonstrated that although *Haplomitrium* possesses certain unique traits, it shares many others with the Metzgeriales and is, indeed, very closely related to this order, yet distant from the Jungermanniales. A classification scheme which best represents the relationships of *Haplomitrium* among the hepatics and reflects a polyphyletic concept of the bryophytes, is attained by revising the classification scheme of Stotler & Crandall-Stotler (1977) by discarding the class Haplomitriopsida and transferring *Haplomitrium* to the Jungermanniopsida, with the Haplomitriales (excluding *Takakia*) and the Metzgeriales grouped together into a newly created subclass, the Metzgeriidae, with only the Jungermanniales retained in the Jungermanniidae. The placement of the Haplomitriales and the Metzgeriales in the same subclass of the Jungermanniopsida emphasizes the close relationship between these taxa, while simultaneously divorcing *Haplomitrium* is classified as follows: division Hepatophyta, class Jungermanniopsida, subclass Metzgeriidae, order Haplomitriales, (excluding *Takakia*), family Haplomitriaceae.

*Metzgeriidae* Bartholomew-Began, *subclass nov.*

Plantae thalloides vel foliatae; folia alaeque thallorum e uno initio, sine trigonis; rami plerumque exogeni; positiones gametangiorum variabiles; sporophyta plerumque non acrogena; perianthia absentes; elateres longi, attenuati.

Plants thalloid or leafy, leaf or thallus wing development from a single wedge shaped cell of a three celled apical derivative, trigones absent, conducting strand of pitted hydroids sometimes present; branches furcate or monopodial, usually of exogenous origin with a dormant, multicellular primordial stage preceding elongation; gametangia variable in position, rarely acrogynous; sporophyte never enclosed by a leaf derived perianth; spores (15-)19-40  $\mu\text{m}$ , with the spore wall development often involving preprophase, callosic, exine precursors; elaters long, slender, attenuate.

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## LITERATURE CITED

- Bartholomew-Began, S.E. 1990. A morphogenetic re-evaluation of *Haplomitrium* Nees (Hepatophyta). Ph.D. dissertation, Southern Illinois University, Carbondale. xvi + 420 pp.
- Schuster, R.M. 1984. Comparative anatomy and morphology of the Hepaticae. in R.M. Schuster (ed.), *New Manual of Bryology*, vol. 2. pp. 760-891. Hattori Bot. Lab., Nichinan, Japan.
- Stotler, R. & B. Crandall-Stotler. 1977. A checklist of the liverworts and hornworts of North America. *Bryologist* 80:405-428.